1. (Amended) A method for detecting target molecules, the method comprising:

a) determining the electronic status of a semiconductor;

b) establishing electronic communication between the target molecules and the semiconductor;

a 4 c) subjecting the semiconductor to energy influx sufficient to produce a charge pair separation on the semiconductor's surface, thereby generating an electronic signal;

d) prolonging the charge separation via a semiconductor surface-modifying molecule;

e) redetermining the electronic status of the semiconductor by amplifying the electronic signal.

10 ~~4.~~ (Amended) A method for detecting molecules, the method comprising:

a 5 c) determining the electronic status of a semiconductor;

d) establishing electronic communication between the molecules and the semiconductor;

e) subjecting the semiconductor to energy influx and;

d) redetermining the electronic status of the semiconductor; wherein the semiconductor is an octahedral metal oxide.

14 ~~7.~~ (Amended) A method for detecting molecules, the method comprising:

a 6 e) determining the electronic status of a ~~semi-conductor~~ semiconductor;

b) establishing electronic communication between the molecules and the semiconductor;

c) subjecting the semiconductor to energy influx; and

d) redetermining the electronic status of the semiconductor, wherein biden-

tate moieties are positioned intermediate the molecules and the semiconductor, and wherein the moieties are dihydroxyl phenyls selected from the group consisting of 1,2-dihydroxyl phenylamine, 1,2-dihydroxyl phenyl alanine, 1,2-dihydroxyl benzoic acid, 1,2-dihydroxyl glycine, 1,2-dihydroxyl benzyl amine, and combinations thereof.

15 12. (Amended) A method for detecting biological molecules, the method comprising:

a) supplying a semiconductor having a first energy level and a second energy level and whereby the first energy level corresponds to a first optical characteristic of the semiconductor;

b) establishing electrical contact between the semiconductor and the molecules;

c) causing electrons to move from the molecules to the second energy level, wherein a charge separation occurs on the surface of the semiconductor;

d) using a semiconductor surface-modifying molecule to prolong the charge separation; and

e) monitoring any change in the first optical characteristic.

23 18. (Amended) A method for detecting biological molecules, the method comprising:

a) supplying a semiconductor having a first energy level and a second energy level and whereby the first energy level corresponds to a first optical characteristic of the semiconductor;

b) establishing electrical contact between the semiconductor and the molecules;

c) causing electrons to move from the molecule to the second energy level;

and

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d) monitoring any change in the first optical characteristic, wherein the semiconductor is an octahedral metal oxide.

28 ~~21~~. (Amended) A method for detecting biological molecules, the method comprising:

a) supplying a ~~semi-conductor~~ semiconductor having a first energy level and a second energy level and whereby the first energy level corresponds to a first optical characteristic of the semiconductor;

b) establishing electrical contact between the semiconductor and the molecules;

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c) causing electrons to move from the molecule to the second energy level, resulting in the formation of an oxidative region on the semiconductor, wherein the oxidative region facilitates the cleavage of molecules;

and

d) monitoring any change in the first optical characteristic.

29 ~~22~~. (Amended) A method for detecting target moieties *in situ,* the method comprising:

a) binding biological material to nanocrystalline semiconductor particles, wherein the material has an affinity to the target moiety;

b) facilitating entry of the bound material into an organelle; and

c) subjecting the semiconductor to radiation sufficient to produce a charge pair separation on the semiconductor's surface; and

d) using semiconductor surface-modifier molecules to prolong the charge separation.

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Please add the following new claims:

11 ~~28.~~ The method as recited in claim 4, wherein the step of redetermining the electronic status further comprises amplifying an electronic signal created when the semiconductor is subjected to energy influx.

12 ~~29.~~ The method as recited in claim 4 wherein the molecules are electron donators.

13 ~~30.~~ The method as recited in claim 4 wherein the molecules are electron acceptors.

14 ~~31.~~ The method as recited in claim 18, wherein the biological molecule extracts electrons from the ~~semi-conductor~~ semiconductor.

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15 ~~32.~~ The method as recited in claim 18, wherein the biological molecule donates electrons to the ~~semi-conductor~~ semiconductor.

16 ~~33.~~ The method as recited in claim 18, wherein a bidentate moiety is intermediate to the ~~semi-conductor~~ semiconductor and the biological molecule.

17 ~~34.~~ The method as recited in claim 18, wherein the ~~semi-conductor~~ semiconductor is between 1 and 20 nanometers in diameter.